

**ABSTRACT OF THE DISCLOSURE**

Chemical species (e.g., metaborate, carbonate, hydroxide and sulfide) in a boron-containing alkaline wood pulping liquor sample are  
5 determined quantitatively by (i) subjecting a first aliquot portion of the sample to a primary acid titration analysis to derive multiple equivalence points at different respective pH values; (ii) subjecting a second aliquot portion of the sample to an analysis to determine the quantitative presence of boron or sulfide ions therein, and then (iii) determining the  
10 quantitative presence in the sample of at least one of the chemical species. Wood pulping parameters may thus be determined on the basis of the quantitative presence of the chemical species to assist in process and/or quality control of the wood pulping operation. For example, the sample may be analyzed for boron content using colorimetry or atomic  
15 spectroscopy and/or analyzed for sulfide ion content using a secondary silver sulfide precipitation titration analysis, each of which may be conducted substantially simultaneously with the primary acid titration analysis.